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☐ **1:** Tongers J, Fiedler B, Konig D, Kempf T, Klein G, Heineke J, Kraft T, Gambaryan S, Lohmann SM, Drexler H, Wollert KC. Related Articles, Links

Heme oxygenase-1 inhibition of MAP kinases, calcineurin/NFAT signaling, and hypertrophy in cardiac myocytes.
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PMID: 15276480 [PubMed - indexed for MEDLINE]

☐ **2:** Mazza F, Goodman A, Lombardo G, Vanella A, Abraham NG. Related Articles, Links

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Exp Biol Med (Maywood). 2003 May;228(5):576-83.
PMID: 12709590 [PubMed - indexed for MEDLINE]

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J Chromatogr B Analyt Technol Biomed Life Sci. 2004 Oct 25;810(2):305-11.
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2: Boiadjiev SE, Lightner DA. Related Articles, Links

Novel benzoic acid congeners of bilirubin.
J Org Chem. 2003 Oct 3;68(20):7591-604.
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Crystal structures of ferrous and CO-, CN(-)-, and NO-bound forms of rat heme oxygenase-1 (HO-1) in complex with heme: structural implications for discrimination between CO and O2 in HO-1.
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5: Tomaro ML, Frydman RB, Awruch J, Valasinas A, Frydman B, Pandey RK, Smith KM. Related Articles, Links

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Cell. 1976 Aug;8(4):513-20.
PMID: 954104 [PubMed - indexed for MEDLINE]

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Biliverdin therapy protects rat livers from ischemia and reperfusion injury.
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Identification of heme oxygenase-1 as a novel BCR/ABL-dependent survival factor in chronic myeloid leukemia.
Cancer Res. 2004 May 1;64(9):3148-54.
PMID: 15126353 [PubMed - indexed for MEDLINE]

☐ **13:** Pae HO, Oh GS, Choi BM, Chae SC, Kim YM, Chung KR, Chung HT. Related Articles, Links

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PMID: 15067050 [PubMed - indexed for MEDLINE]

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Blood mononuclear cell gene expression profiles characterize the oxidant, hemolytic, and inflammatory stress of sickle cell disease.
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PMID: 15004156 [PubMed - indexed for MEDLINE]

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PMID: 14985058 [PubMed - indexed for MEDLINE]

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Heme oxygenase-1-derived carbon monoxide protects hearts from transplant associated ischemia reperfusion injury.
FASEB J. 2004 Apr;18(6):771-2. Epub 2004 Feb 20.
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FASEB J. 2004 Apr;18(6):765-7. Epub 2004 Feb 20.
PMID: 14977878 [PubMed - indexed for MEDLINE]

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Bifunctional role for VEGF-induced heme oxygenase-1 in vivo: induction of angiogenesis and inhibition of leukocytic infiltration.
Blood. 2004 Feb 1;103(3):761-6. Epub 2003 Oct 2.
PMID: 14525760 [PubMed - indexed for MEDLINE]

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L3	1620947	(cell near2 size or big or large)	USPAT	OR	OFF	2005/04/05 20:17
L4	1237529	(polar or polarity near3 morphology or shape)	USPAT	OR	OFF	2005/04/05 20:17
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L7 ANSWER 1 OF 19 EMBASE COPYRIGHT 2005 ELSEVIER INC. ALL RIGHTS RESERVED.
on STN DUPLICATE 1
AN 2002171282 EMBASE
TI Large scale, efficient synthesis of 9-unsubstituted dipyrrinone.
AU Chen Q.; Wang T.; Zhang Y.; Wang Q.; Ma J.
CS Q. Chen, Synapse Technologies, Inc., 6660 NW Marine Drive, Vancouver, BC V6T 1Z4, Canada. qchen@synapse-tech.com
SO Synthetic Communications, (2002) Vol. 32, No. 7, pp. 1031-1040.
Refs: 45
ISSN: 0039-7911 CODEN: SYNCAV
CY United States
DT Journal; Article
FS 029 Clinical Biochemistry
LA English
SL English
ED Entered STN: 20020523
Last Updated on STN: 20020523
AB 9-Unsubstituted dipyrrinone 8, the useful precursor for the synthesis of **biliverdins**, bilirubins, and other bile pigments, was synthesized in **large** scale and high yield starting from acetaldehyde and nitroethane in eight steps with overall yield 10%. The key intermediate 3,4-dimethyl-2-ethoxycarbonylpyrrole 3 was synthesized via Zard-Barton's method in high yield.

L7 ANSWER 2 OF 19 MEDLINE on STN DUPLICATE 2
AN 2002177068 MEDLINE
DN PubMed ID: 11909697
TI Immunohistochemical localization of the antioxidant enzymes biliverdin reductase and heme oxygenase-2 in human and pig gastric fundus.
AU Colpaert Erwin E; Timmermans Jean Pierre; Lefebvre Romain A
CS Heymans Institute of Pharmacology, Ghent University, Ghent, Belgium.
SO Free radical biology & medicine, (2002 Apr 1) 32 (7) 630-7.
Journal code: 8709159. ISSN: 0891-5849.
CY United States
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals

EM 200208
ED Entered STN: 20020324
Last Updated on STN: 20020821
Entered Medline: 20020820
AB The intrinsic antioxidant capacities of the bile pigments biliverdin and bilirubin are increasingly recognized since both heme degradation products can exert beneficial cytoprotective effects due to their scavenging of oxygen free radicals and interaction with antioxidant vitamins. Several studies have been published on the localization of the carbon monoxide producing enzyme heme oxygenase-2 (HO-2), which concomitantly generates biliverdin; histochemical data on the distribution of biliverdin reductase (BVR), converting **biliverdin** to bilirubin, are still very scarce in **large** mammals including humans. The present study revealed by means of immunohistochemistry the presence of BVR and HO-2 in mucosal epithelial cells and in the endothelium of intramural vessels of both human and porcine gastric fundus. In addition, co-labeling with the specific neural marker protein-gene product 9.5 (PGP 9.5) demonstrated that both BVR and HO-2 were present in all intrinsic nerve cell bodies of both submucous and myenteric plexuses, while double labeling with c-Kit antibody confirmed their presence in intramuscular interstitial cells of Cajal (ICC). Our results substantiate the hypothesis that BVR, through the production of the potent antioxidant bilirubin, might be an essential component of normal physiologic gastrointestinal defense in man and pig.

L7 ANSWER 3 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1999:221764 CAPLUS
DN 131:43039
TI Composition, structure and morphological characteristics of gallstones in the Province of Granada. Spain
AU Aguilar, T.; Hidalgo, J. M.; Rodriguez, T.
CS Dept. De Cirugia y sus especialidades. Universidad de Tenerife, Spain
SO Ars Pharmaceutica (1998), 39(2), 129-132
CODEN: APHRAN; ISSN: 0004-2927
PB Editorial Universidad de Granada
DT Journal
LA Spanish
AB Gallstones extracted by surgery at St. Cecilio and Virgen de las Nieves University Hospitals in Granada, Spain, during a 1-yr period, were examined Both general and stratified composition were studied, as well as their structure and morphol. characteristics. The mixed composition appears to be the most common, followed by, in frequence, cholesterol calculi.
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L7 ANSWER 4 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1996:179782 CAPLUS
DN 124:227274
TI Molecular, morphological, and physiological evolution in south pacific scincid lizards (Prasinohaema, Sanguiviridis, Lipinia, biliverdin)
AU Austin, Christopher Cowell
CS Univ. of Texas, Austin, TX, USA
SO (1996) 213 pp. Avail.: Univ. Microfilms Int., Order No. DA9603793
From: Diss. Abstr. Int., B 1996, 56(10), 5366
DT Dissertation
LA English
AB Unavailable

L7 ANSWER 5 OF 19 EMBASE COPYRIGHT 2005 ELSEVIER INC. ALL RIGHTS RESERVED. on STN
AN 96254501 EMBASE
DN 1996254501
TI Reduction of biliverdins to bilirubins: Its metabolic regulation under various physiological conditions.
AU Valasinas A.; Frydman B.

CS Medical School/School of Pharmacy, University of Wisconsin, 425 N. Charter Street,Madison, WI 53706, United States
SO Current Medicinal Chemistry, (1996) Vol. 3, No. 4, pp. 291-302.
ISSN: 0929-8673 CODEN: CMCHE7
CY Netherlands
DT Journal; General Review
FS 029 Clinical Biochemistry
048 Gastroenterology
LA English
SL English
ED Entered STN: 960919
Last Updated on STN: 960919
AB Heme and hemoproteins are degraded in mammals by oxidation to biliverdins. These linear tetrapyrroles are reduced to bilirubins by a cytosolic biliverdin reductase (BvR) at the rate of 250-400 mg per day. While the bulk of biliary biliverdin is biliverdin IXα, other isomers such as biliverdins IXβ and IXγ are formed under conditions of oxidative stress by the chemical degradation of hemoproteins, or from the degradation of abnormal hemoglobins. Rat liver BvR was found to be a NADPH-dependent reductase with a broad substrate specificity, which efficiently reduces a **large** number of **biliverdins** as long as they carry two propionate side-chains. The enzyme was found to exist in three molecular forms, two of which (molecular forms 1 and 3) interconvert under conditions of oxidative stress or in the presence of oxidant species. The different molecular forms have different reduction rates for the biliverdin isomers, thus securing the efficient reduction of biliverdins to bilirubins under different physiological conditions. The molecular mechanism of the enzymatic reduction entails the protonation of the basic pyrrolenine nitrogen (N23) which results in a mesomeric positive charge on the neighboring meso C-10 carbon. The C-10 then undergoes a nucleophilic addition of the hydride released by the NADPH cofactor of BvR. Our studies have established the structural requirements for a biliverdin to be efficiently reduced to a bilirubin. This metabolic step gains relevance as synthetic hemes and metalloporphyrins are increasingly used in therapeutics.

L7 ANSWER 6 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1995:556515 CAPLUS
DN 123:136474
TI Multiple molecular recognition properties of the lipocalin protein family
AU Flower, Darren R.
CS Dep. Physical Chemistry, Fisons Plc, Pharmaceuticals Div., Loughborough, Leicestershire, LE11 0RH, UK
SO Journal of Molecular Recognition (1995), 8(3), 185-95
CODEN: JMORE4; ISSN: 0952-3499
PB Wiley
DT Journal
LA English
AB The lipocalins, a diverse family of small extracellular ligand binding proteins, display a remarkable range of different mol. recognition properties. While their binding of small hydrophobic mols., and to a lesser extent their binding to cell surface receptors, is well known, it is shown here the formation of macromol. complexes is also a common feature of this family. Anal. of known crystallog. structures reveals that the lipocalins possess a conserved common structure: an antiparallel β-barrel with a repeated +1 topol. Comparisons show that within this overall similarity the structure of individual proteins is specifically adapted to bind their particular ligands, forming a binding site from an internal cavity (within the barrel) and/or an external loop scaffold, which gives rise to different binding modes that reflects the need to accommodate ligands of different shape, size, and chemical structure. The architecture of the lipocalin fold suggests that both the ends and sides of this barrel are topol. distinct, differences also apparent in analyses of structural and sequence variation within the family. These differences

can be linked to exptl. evidence suggesting a possible functional dichotomy between the two ends of the lipocalin fold. The structurally invariant end of the mol. may be implicated in general binding to common cell surface receptors, while the more variable end is adapted to the specialized tasks of binding small ligands and forming macromol. complexes via an exposed binding surface.

L7 ANSWER 7 OF 19 EMBASE COPYRIGHT 2005 ELSEVIER INC. ALL RIGHTS RESERVED.
on STN DUPLICATE 3
AN 93287763 EMBASE
DN 1993287763
TI Investigation on intermolecular forces between bile pigments and polar model compounds mimicking the chromophore - Protein interactions in biliproteins.
AU Krois D.
CS Institut fur Organische Chemie, Universitat Wien, Wahringerstrasse 38,A-1090 Wien, Austria
SO Tetrahedron, (1993) Vol. 49, No. 39, pp. 8855-8864.
ISSN: 0040-4020 CODEN: TETRAB
CY United Kingdom
DT Journal; Article
FS 029 Clinical Biochemistry
LA English
SL English
ED Entered STN: 931031
Last Updated on STN: 931031
AB A systematic investigation of intermolecular interactions of biliverdin-IXα-dimethyl ester and 2,18-bridged helically fixed verdinoid and rubinoid analogues with a variety of chiral compounds possessing a limited number of donor and/or acceptor sites was performed. To evaluate interaction strengths the concentration dependence of the induced chiral discrimination between M and P helical species as detected by CD was used. Biliverdin esters show pronounced association only with compounds exhibiting strong hydrogen bonding donor properties. In particular, if the donor of the ligand is provided by a carboxylic acid group defined 1:1 complexes are formed but no protonation of the tetrapyrrole backbone takes place. 2,18-bridged helical bilirubins - being monomeric under the conditions employed - behave similarly but interact with acceptors, too. Association constants were determined by Scatchard plot analysis. The quantitative data gained allow to map the non-covalent, **polar** binding properties of helical **biliverdins** and bilirubins. The implications of results for the conformation determining interactions in biliverdin peptides and biliproteins are discussed.

L7 ANSWER 8 OF 19 MEDLINE on STN DUPLICATE 4
AN 92037639 MEDLINE
DN PubMed ID: 1935972
TI Expression of rat heme oxygenase in Escherichia coli as a catalytically active, full-length form that binds to bacterial membranes.
AU Ishikawa K; Sato M; Yoshida T
CS Department of Molecular and Pathological Biochemistry, Yamagata University School of Medicine, Japan.
SO European journal of biochemistry / FEBS, (1991 Nov 15) 202 (1) 161-5.
Journal code: 0107600. ISSN: 0014-2956.
CY GERMANY: Germany, Federal Republic of
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 199112
ED Entered STN: 19920124
Last Updated on STN: 19980206
Entered Medline: 19911219
AB A plasmid, pKK-RHO, was constructed by incorporating the coding sequence

of a cDNA for rat heme oxygenase into the expression vector pKK233-2. Escherichia coli strain XL1-blue transformed with pKK-RHO produced a catalytically active, full-length heme oxygenase. The 32-kDa native enzyme expressed, was localized in the bacterial membranes, possibly due to the spontaneous membrane-binding properties of a hydrophobic segment in its C-terminal region. During cultivation, a few degraded forms of heme oxygenase that had lost their membrane-associative properties appeared. Probably, some bacterial proteases cut the native heme oxygenase at sites near its C-terminus and so release hydrophilic peptides of heme oxygenase from the membranes. A 30-kDa polypeptide, one of the degraded forms of heme oxygenase, retained ability to accept electrons from NADPH--cytochrome P450 reductase and also activity for catalyzing breakdown of heme to biliverdin. The cultured cells were pale green. From them we extracted green pigment(s), of which the absorption spectrum closely resembled that of **biliverdin**, suggesting that a **large** amount of the endogenous heme of E. coli was actually degraded to biliverdin by the expressed heme oxygenase.

L7 ANSWER 9 OF 19 MEDLINE on STN DUPLICATE 5
AN 85097750 MEDLINE
DN PubMed ID: 6518163
TI The specificity of biliverdin reductase. A study with different biliverdin types.
AU Tomaro M L; Frydman R B; Awruch J; Valasinas A; Frydman B; Pandey R K; Smith K M
NC GM-11973 (NIGMS)
HL-22252 (NHLBI)
SO Biochimica et biophysica acta, (1984 Dec 21) 791 (3) 350-6.
Journal code: 0217513. ISSN: 0006-3002.
CY Netherlands
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 198502
ED Entered STN: 19900320
Last Updated on STN: 19970203
Entered Medline: 19850225
AB The specificity of rat liver biliverdin reductase was examined with the help of a series of synthetic biliverdins. The mixture of the four biliverdin isomers obtained by the chemical oxidation of protohemin I, protohemin XI, protohemin XIV and harderohemin were used as substrates of biliverdin reductase and were compared with the mixture of biliverdins IX alpha-delta. Biliverdin reductase (molecular form 1) from rat liver efficiently reduced the isomer mixtures of biliverdins I, XI, XIV and harderobiliverdins to the bilirubins in the presence of NADPH. The enzymatic reduction of the different biliverdin types was studied in the presence of different NADPH analogues. NADPH could be replaced by NADH, 3-acetyl NADPH and deamino-NADPH with retention of a good substrate activity only in the case of biliverdins of types I and IX and harderobiliverdins. Biliverdins XI and XIV were efficiently reduced only in the presence of NADPH and an excess of NADH. Bactobilin III-alpha was also very efficiently reduced by biliverdin reductase in the presence of both NADPH and NADH but not in the presence of the other analogues. These results indicate that **biliverdin** reductase reduced bilitriene acids substituted with non-**polar** and polar residues.

L7 ANSWER 10 OF 19 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN DUPLICATE 6
AN 1984:200815 BIOSIS
DN PREV198477033799; BA77:33799
TI BILIVERDIN ACCUMULATION IN THE CAUDAL INTESTINAL SEGMENT OF JUVENILE ADULT LAMPREYS PETROMYZON-MARINUS.
AU LANGILLE R M [Reprint author]; YOUSON J H
CS SCARBOROUGH COLL, UNIV TORONTO, WEST HILL, ONT, CANADA M1C 1A4

SO Canadian Journal of Zoology, (1983) Vol. 61, No. 8, pp. 1824-1834.
CODEN: CJZOAG. ISSN: 0008-4301.
DT Article
FS BA
LA ENGLISH
AB The possibility of bile pigment excretion by the caudal intestinal region in lampreys was investigated using spectrophotometry, routine electron microscopy and an exogenous protein tracer. The green pigment present in the caudal intestines of immediately postmetamorphic and juvenile adult lampreys was biliverdin. Cytoplasmic inclusions, which resembled biliary inclusion bodies and which were not formed as a result of exocytosis of materials at the apical surface, were found in the caudal intestine in absorptive, caveolated and mucous cells concomitant with the appearance of the biliverdin. Evidence therefore indicates that these inclusions probably contain **large** quantities of the bile pigment **biliverdin** and other substances with which it may be complexed. The caudal segment of the adult lamprey intestine probably serves as a site for the elimination of bile pigment in the form of biliverdin. This method of elimination of bile pigment may be an essential function of the intestine owing to the absence of a bile duct in this animal.

L7 ANSWER 11 OF 19 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN DUPLICATE 7
AN 1979:258633 BIOSIS
DN PREV197968061137; BA68:61137
TI RED AND BLUE-GREEN BILE PIGMENTS IN THE SHELL OF ASTRAEA-TUBER MOLLUSCA ARCHAEOGASTROPODA.
AU JONES P [Reprint author]; SILVER J
CS DEP CHEM, UNIV W INDIES, ST AUGUSTINE, TRINIDAD
SO Comparative Biochemistry and Physiology B, (1979) Vol. 63, No. 2, pp. 185-188.
CODEN: CBPBB8. ISSN: 0305-0491.
DT Article
FS BA
LA ENGLISH
AB The shells of A. tuber contain red and blue-green pigments extracted by aqueous acid solutions. The dissolved red pigment was unstable and changed rapidly to a grey or black-green solution. The extremely polar pigments were isolated by a macroreticular resin and separated by a cellulose based weak anion exchange system. The spectroscopic data showed that the blue-green pigment was a **biliverdin** with 1 or more highly **polar** groups attached. The black-green pigment gave poorly defined absorption spectra but the presence of a bilatriene compound was confirmed by oxidation studies. The red pigment in the A. tuber shell is possibly a biladiene which isomerizes to a green bilatriene on contact with acidic solutions.

L7 ANSWER 12 OF 19 MEDLINE on STN DUPLICATE 8
AN 77185334 MEDLINE
DN PubMed ID: 862775
TI Linkage between chromophore and apoprotein in the **biliverdin** -protein of the scales of **big** blue parrotfish, Scarus gibbus Ruppell.
AU Yamaguchi K; Kubo K; Hashimoto K; Matsuura F
SO Experientia, (1977 May 15) 33 (5) 583-4.
Journal code: 0376547. ISSN: 0014-4754.
CY Switzerland
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 197707
ED Entered STN: 19900314
Last Updated on STN: 19900314
Entered Medline: 19770718

L7 ANSWER 13 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1978:102273 CAPLUS
DN 88:102273
TI Clinical significance of morphofunctional changes in the hematoencephalic barrier in different periods of life
AU Sharipov, F. Kh.; Pol'skii, V. I.
CS Tadzh. Gos. Med. Inst., Dushanbe, USSR
SO Zdravookhranenie Tadzhikistana (1977), (4), 32-6
CODEN: ZDTAAJ; ISSN: 0514-2415
DT Journal
LA Russian
AB Samples of the choroid plexus of the lateral ventricle were obtained from humans ranging in age from stillborns through 85-yr-olds and were histochem. analyzed with respect to gross **morphols.**, cytomorphol., **biliverdin**, and bilirubin. Increasing amts. of deterioration in the choroid plexus were observed with increasing age; beginning with 20-yr-olds, constricted capillaries and the formation of psammoma bodies in the completely constricted capillaries were observed The psammoma bodies increasingly replaced the epithelial cells with progressive aging. The cytoplasm of the epithelial cells of the choroid plexus from the very young to adolescent subjects contained small droplets or granules that stained pos. for biliverdin. The cytoplasm of similar samples from >20-yr-old people contained **large**, spherical erythrocyte-like inclusions that stained pos. for **biliverdin** or the biliverdin-bilirubin complex. This apparently is a manifestation of the phagocytosis of erythrocyte by the choroid plexus epithelial cells with the concomitant degradation of Hb. The extent of such phagocytosis generally increased with age except for a temporary decrease observed in the 60-75-yr-old group. The various changes presumably lead to an increased permeability of the blood-brain barrier.

L7 ANSWER 14 OF 19 MEDLINE on STN DUPLICATE 9
AN 75160145 MEDLINE
DN PubMed ID: 1129759
TI Sequence of heme decomposition by the coupled oxidation of myoglobin with ascorbic acid.
AU Yoshida T; Kikuchi G
SO Tohoku journal of experimental medicine, (1975 Jan) 115 (1) 67-74.
Journal code: 0417355. ISSN: 0040-8727.
CY Japan
DT Journal; Article; (JOURNAL ARTICLE)
LA English
FS Priority Journals
EM 197507
ED Entered STN: 19900310
Last Updated on STN: 19900310
Entered Medline: 19750714
AB Occurrence of a biliverdin-iron complex or verdoheme as the final oxidation product of heme moiety in the coupled oxidation of myoglobin and ascorbic acid in air was evidenced and the sequence of heme decomposition in this reaction system was concluded to proceed in the order of protoheme, hydroxyheme and biliverdin-iron complex or verdoheme. The final oxidation product usually remains attaached to globin and appears to give a diffuse absorption possibly with a peak at 760 nm at neutral pH. In alkaline solution the compound exhibits an absorption peak at 840 nm, and when reduced with Na(2)S(2)O(4), it is readily converted to **biliverdin** which exhibits a **large** absorption with a peak originally at 800 nm, being followed by a gradual shift to 760 nm.

L7 ANSWER 15 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1971:94480 CAPLUS
DN 74:94480
TI Green pigment produced from tuna metmyoglobin

AU Koizumi, Chiaki; Nonaka, Junsakuu
CS Tokyo Univ. Fish., Tokyo, Japan
SO Nippon Suisan Gakkaishi (1970), 36(12), 1258
CODEN: NSUGAF; ISSN: 0021-5392
DT Journal
LA English
AB Under aerobic but not under anaerobic conditions, the prosthetic group of metmyoglobin (I) from red muscle of **big** eye tuna [Thunnus obesus (tunny)] was converted to **biliverdin** (II) or a closely related compound Crystalline I 1.5, cysteine-HCl.H2O 9.5, and trimethylamine oxide.2H2O 3.2 g in 1 l. phosphate buffer, pH 6.5, were heated at 72-74° for 5 min. After centrifugation, the green precipitate was washed with water and acetone, extracted with HCl-acetone, concentrated in vacuo, adjusted to pH 5-6 with NaOAc, and extracted with ether. Crystals of a Me ester resembling II di-Me ester were obtained. Whether this green pigment participates in the greening of tuna was not determined

L7 ANSWER 16 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1969:519962 CAPLUS
DN 71:119962
TI Enzymic oxidation of bilirubin
AU Brodersen, R.; Bartels, P.
CS Koebenhavn Univ., Copenhagen, Den.
SO European Journal of Biochemistry (1969), 10(3), 468-73
CODEN: EJBCAI; ISSN: 0014-2956
DT Journal
LA English
AB The following agents were found to oxidize bilirubin in vitro: Hb and horse-radish peroxidase (both with H2O2), cytochrome c, xanthine oxidase, and an insol. oxidase, present in brain and other tissues. Kinetic consts. were determined The process with Hb was inhibited competitively by 2 product mols. The insol. oxidase from brain was present in mitochondria. The supernatant fraction contained an inhibitor. The oxidase was inactive in the absence of salt and was unspecifically activated by a number of salts, the activity depending upon ionic strength, irrespective of which ions were present. Reaction products included **biliverdin** and a yellow, diazo-neg., **polar** pigment with the same oxidation level as bilirubin.

L7 ANSWER 17 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1956:74693 CAPLUS
DN 50:74693
OREF 50:14076h-i,14077a
TI Serum bile pigments
AU Billing, B. H.; Lathe, G. H.
CS Queen Charlotte's Maternity Hosp., London
SO Proceedings of the International Congress of Biochemistry (1955) 123
CODEN: 18USAR
DT Journal
LA Unavailable
AB Protein-free exts. of serum from jaundiced patients give bilirubin (fat-soluble and giving the indirect van den Bergh reaction) and 2 water-soluble pigments (I and II) giving the direct reaction. The excretion of bilirubin (III) in the bile involves its conversion to II, which is more polar than I. Coupling with diazotized sulfanilic acid splits III into 2-dipyrroles and yields an azo pigment (IV), while II forms a more polar azo pigment (V). I gives a mixture of IV and V. The formation of I probably involves a change in half of the III mol., while in II both halves of the mol. are altered. Diazotized aniline, sulfanilic acid, and p-aminobenzoic acid all give stable azo pigments with II and III (no details). Oxidation of fistula bile yields "verdin" compds. which are

more **polar** than **biliverdin** and show the same
relationto it as do the direct-reacting pigments to III.

L7 ANSWER 18 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN DUPLICATE 10
AN 1945:27219 CAPLUS
DN 39:27219
OREF 39:4374g-i,4375a
TI The formation of bile pigments from hemoglobin and verdoglobin by liver extracts
AU v. Kesztyus, Lorand; Kiese, Manfred
SO Klinische Wochenschrift (1943), 22, 746-7
CODEN: KLWOAZ; ISSN: 0023-2173
DT Journal
LA Unavailable
AB Liver pulp and liver extract, prepared by extraction of liver with an equal weight of
0.1 mol. phosphate (pH 7.4) at 37° under toluene and centrifuging, form bile acids from hemoglobin and verdoglobin. The formation from the latter occurs far more readily than from the former. By the use of hemoglobin there is initially a slight formation of verdoglobin. At pH 5.2 liver extract forms bile pigment from verdoglobin but from hemoglobin neither bile pigment nor verdoglobin are formed. At pH 7.4 the addition of acid inhibits the pigment formation but not that of verdoglobin from hemoglobin. The verdoglobin is characterized as verdoglobin S by its absorption maximum at 620 mμ and that of its CO compound at 615-620 mμ. The yield in bilirubin amounts to 10-20% of the transformed verdoglobin or hemoglobin. A **large** part of the pigment is **biliverdin**
. Dialysis against H2O removes from the liver extract the capacity to form bile pigments, but it is restored by the addition of boiled liver juice, inert itself. If the extract is 3/4-saturated with (NH4)2SO4 a large part of the
inert protein is precipitated Total saturation ppts. the active principle, which
however must be reactivated with boiled liver juice.

L7 ANSWER 19 OF 19 CAPLUS COPYRIGHT 2005 ACS on STN
AN 1944:2469 CAPLUS
DN 38:2469
OREF 38:414c
TI Biliverdin of toad blood
AU Ruz, Julio Cabello
SO Revista de la Sociedad Argentina de Biologia (1943), 19, 81-93
CODEN: RSABAC; ISSN: 0037-8380
DT Journal
LA Unavailable
AB Small amts. of bile pigments appear to be formed in the body of the toad elsewhere than in the liver which is the principal site of formation. Destruction of hemoglobin in the blood, as by poisoning with phenylhydrazine, causes a greenish discoloration of most of the body tissues and a **large** increase in biliary excretion of **biliverdin**.

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